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Patent No. 6,764,555
Request for Cert. of Correction dated November 2, 2004
Attorney Docket No. 2204-011501

10004919

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Patent No.	:	6,764.555 B2	Confirmation No. 9828
Inventors	:	Hiramatsu et al.	
Issued	:	July 20, 2004	
Title	:	High-Strength Austenitic Stainless Steel Strip Having Excellent Flatness and Method of Manufacturing Same	
Examiner	:	Deborah Yee	
Customer No.	:	28289	

REQUEST FOR CERTIFICATE OF CORRECTION OF PATENT
FOR PTO MISTAKE (37 C.F.R. 1.322(a))

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

ATTENTION: Decision and Certificate of Correction Branch
Patent Issue Division

Sir:

In accordance with 35 U.S.C. §254, we attach hereto Form PTO/SB/44 and a copy of proof of PTO error(s) and request that a Certificate of Correction be issued in the above-identified patent. The following errors appear in the patent as printed:

Column 4, Line 23 to Column 4, Line 28, Paragraph beginning "Each of REM" and ending "cleanliness of the steel" should be placed before the paragraph beginning at Column 4, Line 34 that begins with "The newly proposed steel strip".

(See the original specification, page 6, lines 25-28 and the Prelimnary Amendment of 12/03/2001, page 9, first replacement paragraph.)

Respectfully submitted,

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24 NOV 2004

PTO/SB/44 (04-04)
Approved for use through 04/30/2007. OMB 0651-0033
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

(Also Form PTO-1050)

UNITED STATES PATENT AND TRADEMARK OFFICE
CERTIFICATE OF CORRECTION

PATENT NO. : 6,764,555 B2

DATED : July 20, 2004

INVENTOR(S) : Hiramatsu et al.

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Column 4, Line 23 to Column 4, Line 28, Paragraph beginning "Each of REM" and ending "cleanliness of the steel" should be placed before the paragraph beginning at Column 4, Line 34 that begins with "The newly proposed steel strip".

{W0150103.1}

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PATENT NO. 6,764,555 B2

No. of additional copies

24 NOV 2004

A HIGH-STRENGTH AUSTENITIC STAINLESS STEEL STRIP HAVING EXCELLENT ~~IN~~ FLATNESS ~~OF SHAPE~~ AND ~~ITS MANUFACTURING~~ METHOD OF MANUFACTURING SAME

BACKGROUND OF THE INVENTION

The present invention relates to a high-strength meta-stable austenitic stainless steel strip composed of a dual-phase structure of austenite and martensite exhibiting excellent ~~in~~ flatness ~~of shape~~ with Vickers hardness of 400 or more. The invention ~~and~~ also relates to a manufacturing method thereof.

Martensitic, work-hardened or precipitation-hardened stainless steel has been typically used ~~so far~~ as a high-strength material with a Vickers hardness of 400 or more.

Martensitic stainless steel such as SUS 410 or SUS420J2 is ~~material~~ hardened by quenching from a high-temperature austenitic phase to induce martensite transformation. Since the steel material is adjusted to a Vickers hardness of 400 or more by heat-treatment such as quenching-tempering, its manufacturing process necessitates such the heat-treatment. The steel strip unfavorably reduces its toughness after quenching and changes its shape due to the martensite transformation. These disadvantages put considerable restrictions on manufacturing conditions.

Work-hardened austenitic stainless steel such as SUS 301 or SUS 304 is often used instead, in the case where deviation of shape causes troubles on usage. The work-hardened austenitic stainless steel has an austenitic phase in a solution-treated state and generates a deformation-induced martensite phase effective for improvement of strength during cold-rolling thereafter.

Although ~~a shape~~ the surface of a steel strip is flattened by cold-rolling, dependency of hardness on a rolling temperature is ~~too big~~ great, and the ~~shape is irregularly varied~~ surface flatness varies irregularly along a lengthwise direction or rolling direction of the steel strip. ~~In this~~ As a consequence, it is difficult to flatten ~~the shape of~~ uniformly the steel strip under stable conditions by cold-rolling from ~~an~~

Ti up to 0.50 mass %

Ti is an optional alloying element, which promotes age-hardening and improves strength during reversion. However, excessive addition of Ti above 0.50 mass % causes occurrence of scratches on a surface of slab and troubles on a manufacturing process.

Nb up to 0.50 mass %

Nb is an optional alloying element, which improves strength during reversion but degrades hot-workability of a steel strip. In this sense, Nb content shall be limited to 0.50 mass % or less.

Al up to 0.2 mass %

Al is an optional alloying element, which serves as a deoxidizing agent in a steel-making step and remarkably reduces type-A inclusions harmful for press-workability. The effects of Al are saturated at 0.2 mass %, and excessive addition of Al causes other troubles such as occurrence of surface flaws.

B up to 0.015 mass %

B is an optional alloying element effective for inhibiting the occurrence of edge cracks, which are derived from a difference of deformation resistance between δ-ferrite and austenite at a hot-rolling temperature, in a hot-rolled steel strip. However, excessive addition of B above 0.015 mass % causes generation of somewhat low-melting boride and ~~rather~~ deteriorates hot-workability.

REM (rare earth metals) up to 0.2 mass %

Y up to 0.2 mass %

Ca up to 0.1 mass %

Mg up to 0.1 mass %

Each of REM, Y, Ca and Mg is an optional alloying element, which improves hot-workability and oxidation resistance. Such the effects are saturated at 0.2 mass % REM, 0.2 mass % Y, 0.1 mass % Ca and 0.1 mass % Mg, respectively, and excessive addition of these elements worsen the ~~worsens~~ cleanliness of steel material.

The newly proposed steel strip further includes P, S and O other than the

PATENT APPLICATION
Attorney Docket No. 2204-011501

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of :

Naoto HIRAMATSU :
Kouki TOMIMURA :
Hiroshi FUJIMOTO :
Kenichi MORIMOTO :

HIGH-STRENGTH AUSTENITIC STAINLESS STEEL STRIP HAVING EXCELLENT FLATNESS AND METHOD OF MANUFACTURING SAME

Serial No. Not Yet Assigned :

Filed Concurrently Herewith :

Pittsburgh, Pennsylvania
December 3, 2001

PRELIMINARY AMENDMENT

Commissioner for Patents
Washington, D.C. 20231

Sir:

Prior to initial examination, please amend the above-identified patent application as follows:

IN THE SPECIFICATION:

Please amend section headings and amend specification paragraphs as follows.

Please replace the title beginning at page 1, line 1 with the following rewritten title:

HIGH-STRENGTH AUSTENITIC STAINLESS STEEL STRIP HAVING EXCELLENT FLATNESS AND METHOD OF MANUFACTURING SAME

Please replace the paragraph beginning at page 6, line 25 with the following rewritten paragraph:

Each of REM, Y, Ca and Mg is an optional alloying element, which improves hot-workability and oxidation resistance. Such the effects are saturated at 0.2 mass % REM, 0.2 mass % Y, 0.1 mass % Ca and 0.1 mass % Mg, respectively, and excessive additions of these elements worsen the cleanliness of the steel.

Please replace the paragraph beginning at page 6, line 29 with the following rewritten paragraph:

The newly proposed steel strip further includes P, S and O other than the above-mentioned elements. P is an element effective for solution-hardening but harmful for toughness, so that an upper limit of P content is preferably determined at a conventionally allowable level of 0.04 mass %. S content shall be controlled to a lowest possible level, since S is a harmful element which causes occurrence of ear cracks during hot-rolling. The harmful influence of S can be inhibited by addition of B, so that allowable S content is preferably determined at 0.02 mass % or less. O generates nonmetallic oxide inclusions, which worsens the cleanliness of the steel and harms press-workability and bendability. Hence, the O content is preferably controlled at a ratio of 0.02 mass % or less.

Please replace the paragraph beginning at page 7, line 12 with the following rewritten paragraph:

According to the present invention, a shape of a stainless steel strip is flattened by volumetric change during re-heating to induce a phase reversion from deformation-induced martensite, which is generated by cold-rolling, to austenite. For such a reversion, a value Md(N) representing the stability of an austenitic phase against working is controlled in a range of 0-125 so as to generate deformation-induced martensite by cold-rolling after solution-treatment. The value Md(N) shall be not less than 0; otherwise cold-rolling at an